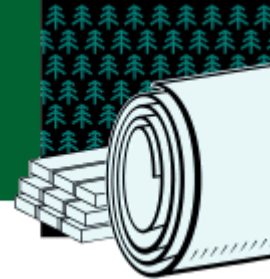


FOREST PRODUCTS

Project Fact Sheet



PRESS AND DRYER ROLL SURFACES AND WEB TRANSFER SYSTEMS FOR ULTRA-HIGH PAPER MACHINE SPEEDS

BENEFITS

- Improves paper machine runability (fewer breaks per day)
- Increases capital effectiveness of industry
- Improves utilization of the first dryer section
- Enhances machine and energy efficiency
- Achieves higher operating speeds for machine
- Improves surface properties of paper sheet

APPLICATIONS

Beloit Corporation will be responsible for demonstrating and commercializing the new technology.

New Technology Will Overcome Barriers to Higher Speeds

The U.S. pulp and paper industry will need paper machines that operate at substantially higher speeds than those used today if it is to remain competitive in coming decades. There are a number of barriers that researchers must overcome, however, to achieve these improvements. A primary issue is to solve the problem of transferring the web at ultra-high speeds from press rolls and dryer cylinders. This requires a better understanding of the physical mechanisms that account for adhesion forces between the paper web and roll surfaces.

If this project is successful, industry will achieve higher operating speeds in its paper machines. Other potential benefits are less downtime for the machines and fewer breaks in the paper web. The first dryer section will be better used, which will reduce energy use and improve the efficiency of the machines. Finally, there will be less damage to the paper sheet during processing, improving the surface properties of the final paper.

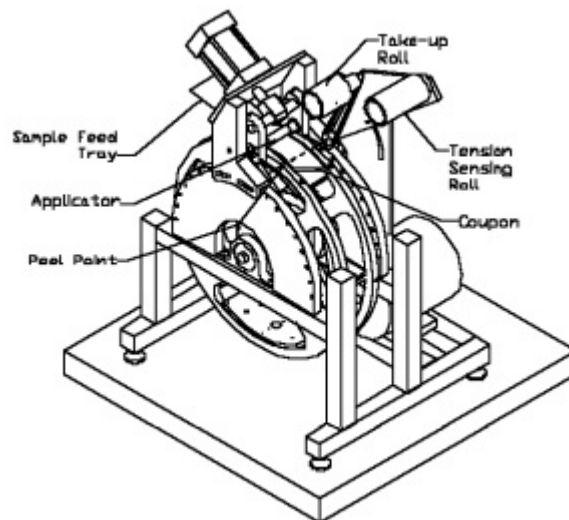


Figure 1. The schematic shows a web adhesion and drying simulator, part of the research effort to develop new high-speed paper machines.



OFFICE OF INDUSTRIAL TECHNOLOGIES
ENERGY EFFICIENCY AND RENEWABLE ENERGY • U.S. DEPARTMENT OF ENERGY

PROJECT DESCRIPTION

Goal: To develop new technology that allows the paper web to be transferred at ultra-high speeds from press rolls and dryer cylinders.

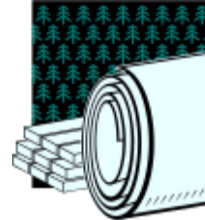
Researchers will study the materials on the roll surfaces and how they influence web transfer. These materials represent the chemical make-up of the rolls and contaminants that accumulate during use. They will also examine models of web transfer at ultra-high speeds including the Mardon equation, and technology for roll surface conditioning.

Six tasks will be performed during this project, which is scheduled to run for three years: (1) Identify contaminants and measure surface topologies at mills; 2) build equipment to simulate contamination process; 3) build equipment to simulate web transfer; 4) develop empirical models of contamination, adhesion, and picking; 5) develop and verify models to predict web transfer; and 6) develop and demonstrate roll surface conditioning technology.

PROGRESS & MILESTONES

The current status of the tasks follows:

- Task 1 - Two fine paper machines were visited, contaminants from dryer rolls were analyzed for chemical composition, and underlying roll surface topology was measured.
- Task 2 - Equipment has been built to simulate contamination process on removable coupons
- Task 3 - Equipment is in process of being fabricated that will allow simulation of drying, pressing, and web transfer from the coupons contaminated in Task 2. Expected completion date is November 1999.
- Task 4 - Start-up was in October 1999.



PROJECT PARTNERS

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